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CRIME DETECTION WITH THE AID OF SCRIPT ANALYSIS

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FOREWORD

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CRIME DETECTION WITH THE AID OF SCRIPT ANALYSIS

Translation

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The Police Officer
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German

W. M.

Based on a lecture by Police First Lieutenant
E. Bachman, Zurich Cantonal Police

The spring conference of the Swiss Criminological Society was held in Zurich on 16 and 17 June 1951. We know that it is the primary mission of this society to further penal law in actual practice and to promote the combatting of crime. This circumstance also tells us why the conference participants are mostly judges and court officials, attorneys general, investigation judges, district attorneys, etc. Nevertheless, we also have a considerable number of police agencies, police chiefs, criminal police officers, etc., represented at these sessions, for at times lectures are given at these conferences which are highly instructive also for the police.

The police were represented quite strongly this spring and that was rather unusual. In addition to a very informative tour through the Forensic Medicine Institute, where by the way a part of the conference was held, it was especially the lecture by First Lieutenant Emil Bachmann of the Zurich Cantonal Police that offered us the most interesting topic. The lieutenant was kind enough to let us have his lecture notes; we are therefore in a position to report in greater detail on the field of crime detection through script analysis which he discussed. For financial reasons we had to eliminate some figures and a large part of the plates had to be squeezed together on one side.

Police First Lieutenant Bachmann may justifiably be called a script expert; besides, his unit, the Zurich Cantonal Police, is collecting all kinds of writing samples. The classification is made on the basis of the various characteristic features which result from the numerical index value of 10 different categories. Accordingly, we get a 10-place formula, where for instance the first number indicates the special characteristics from category 1 (ligature forms), the second number those from category 2 (degree of ligature), etc. (cf. Figure 11).

The lieutenant modestly described his valuable presentation as an

attempt at indicating the possibilities leading to the discovery and proof of the facts of a case in judicial investigations, which are aimed at the determination of the genuineness or falsity of documents. Among others, he stated the following.

Every age has its crimes and its corresponding protective measures, depending on the particular prevailing standard of living. In every age, criminals knew how to use the prevailing conditions of the times to their own advantage. But step by step, the law was able to deprive the criminal of these advantages through the discovery of new aids. Since the dawn of European culture, there have been two great epochs in the history of documentology. In the first, prepared animals skins, called parchment, were the means for recording culture; writing was a secret art reserved only for the initiated. Forgery flourished in the Middle Ages mostly in the successful preparation of property deeds and land purchase contracts. In the next epoch, paper was produced, book printing was invented, and instruction in writing gradually became a widespread thing. Under these new conditions, the forger again was way ahead of our society. Even during a long period in the eighteenth century, shameless forgeries and falsifications were possible. With the invention of the typewriter, we have entered a new epoch of documentary material. Despite the tremendous progress in the field of script analysis, many forged documents remain unsuspected and are used as the genuine article in everyday life. The immense increase in the use of documents is a characteristic sign of modern civilization. All kinds of documents, from the smallest to the greatest value, are today vulnerable to forging. In some cases, the disposition of hundreds of thousands of Francs depends on the identification of a single signature. This excellent opportunity is so great a temptation for some people that it seems impossible to restrain them from committing such a crime. Many cases reveal the fortunate fact that those who want to commit the crime of forgery are rarely skilful enough to do a good job. Documents are contested for various reasons. Most of these documents can be classified in the following manner.

1. Documents with contested signatures. These include checks, IOU's, bills, receipts, money orders, purchase order, contracts, concessions, last wills, and similar pieces of writing.
2. Documents with allegedly fraudulent changes. Here we must include all documents in which any change whatever has been made, be it through erasures, insertions, writing between lines, postscripts, insertion of different figures or dates, as a result of which the purpose and effect of the document could be changed essentially.
3. Disputed or contested last wills "given under the signer's own hand." These are mostly documents in which the entire text is contested.

4. Documents which are being contested on account of their alleged age or date.

5. Documents which are being contested on account of the writing materials used in their preparation.

6. Documents prepared by typewriter:

(a) for the purpose of the determination of their origin, i.e., from a certain typewriter;

(b) for the purpose of determining the person who typed the document;

(c) for the purpose of the determination of the time the document was prepared.

7. Documents or pieces of writing being examined for the purpose of identification of a person through handwriting:

(a) anonymous and pseudoanonymous letter;

(b) blackmail and threatening letters;

(c) writeovers and entries in bills, books, contracts, etc.

Another important group is that in which suspected or arrested persons write letters in order to direct suspicion at another person.

In the various kinds of disputed documents, there are two questions with respect to the handwriting. The first question is whether a certain piece of writing is genuine or forged. The second question is whether such a piece of writing can serve to identify the person who wrote it. In case of disguised handwriting, the writer endeavors to eliminate the individual characteristics of his handwriting through the use of characters that are foreign to his style of handwriting. The problem in the testing of such writings consists in determining and weighing against each other the intentionally adopted or foreign writing characteristics, on the one hand, and the inadvertent or subconscious characteristics, on the other hand. A copied handwriting style is a handwriting in which the attempt has been made to imitate the style of another person, such as it happens often in the case of ordinary signature copying. Such a script consists of a twofold process. The writer must not only consider the characteristic features of the style to be copied, but must also suppress his own personal writing characteristics. Disguised handwriting can usually be spotted by the fact that important characteristic features are inconsistent. When a signature has been proved to be forged, the next question of course is:

who is the forger? In a freehand forgery, this question can at times be answered; but in a traced forgery, this can usually not be done. It is much easier to prove that a signature has been forged than that such a signature is really the work of a certain culprit. The degree of certainty in proving a forgery, on the one hand, and in proving the identity through handwriting, on the other hand, is quite different in the various cases and, depending on the circumstances, may extend from mere suspicion to conclusive proof. In the examination of suspected or contested documents, utmost importance must be assigned to the procurement of recognized genuine handwriting. The best writing samples are those which date from approximately the same period and which reveal the same kind of writing as the disputed document. In taking writing samples, the thinking processes of the sample writer should be so pinned down that he will not have any time to think about script forms. In dictated writing samples, one should, where possible, recreate the same writing conditions as in the preparation of the suspected or disputed writings. Here one will use the same paper format and the same writing material. One must never let the accused copy the incriminating piece of writing. Writing samples should as a matter of principle be obtained only from dictation. Good comparison material is the foundation of every successful script examination.

An important aid in the discovery of the writing criminal consists in the handwriting collection. Suitable writing samples are taken from habitual criminals and from all delinquents of whom one can expect that they will again get in trouble with the law. In place of the alphabetical arrangement of writing samples, the script is classified in a manner similar to fingerprint classification. Here, ten of the most important graphic characteristics of the script must be taken into consideration. Each characteristic is given a certain numerical value, so that in the end a 10-place formula comes out according to which the writing sample is filed in the collection. Those writing characteristics which, on the basis of experience, are least disguised or distorted will appear in the beginning of the formula, while those characteristics, which are most disguised, will be placed toward the end.

With the help of many slides, the lecturer then clearly demonstrated the various categories and their corresponding numerical values. These 10 categories, which we are showing in Figures 1-10, are the subject of the following compilation, whereby however one must remember that, e.g., letter (a) from Number 1 corresponds to classification number 1, while letter (b) corresponds to classification number 2, etc.

Classification Number

Figure 1 Category 1 -- Ligature form or duct

a - b	Garland duct (leftward)	1
c - d	Arcade duct (rightward)	2
e	Angle duct	3
f	Arcade garland duct (thread duct)	4

Figure 1 Category 1 -- Ligature form or duct Classification Number

g	Garland-angle duct	5
h	Arcade-angle duct	6
All other forms are combined in		7

Figure 2 Category 2 -- Degree of ligature

a	linked (contiguous and one-stroke groups of five and more letters)	1
b	unconnected (letters entirely separate next to each other or in groups of no more than four contiguously written letters)	2

Figure 3 Category 3 -- Character form

a	simple	1
b	fancy	2

Figure 4 Category 4 -- Distribution of "i" dot

a	i-dot very low	1
b	i-dot in middle	3
c	i-dot very high	2

Figure 5 Category 5 -- Ascending letters

a	very small ascenders	1
b	medium ascenders	3
c	very large ascenders	2

Figure 6 Category 6 -- Descending letters

a	very small descenders	1
b	medium descenders	3
c	very large descenders	2

Figure 7 Category 7 -- Script width

a	very narrow script	1
b	medium script width	3
c	very wide script	2

Figure 8 Category 8 -- Script positioning Classification Number

a	steep script	1
b	very strong rightward inclination	2
c	normal script position	3
d	changing script position	4

Figure 9 Category 9 -- Script imprint pressure

a	very thin	1
b	medium	3
c	very thick	2

Figure 10 Category 10 -- Script size

a	very small	1
b	medium	3
c	very large	2

Figure 11 -- Classified writing sample. L (top, right, in figure) means Latin (pure); L-D means Latin and German/Gothic script/ mixed; (predominantly Latin); D-L means mixed German and Latin (predominantly German); D means German (old German script, pure).

The classification method is set up according to the increase in the graphic execution difficulties, i.e., the characteristics which are more difficult to suppress in case they are present and which are harder to introduce in case they are absent, are located at the start of the classification number.

The digits of the graphic characteristics 1 - 3, 4-6, and 7-10 are combined into groups in the classification formula for greater clarity and are separated from each other by a dash. Example 311-323-3123.

Figure 12. Influence of alcohol on writing.

Figure 13. Traced forgery (original shows grooves made by writing tool); left: genuine; right: forged.

Figure 14. Freehand imitation forgery.

Figure 15 and 16. Handwriting comparison (left: the incriminating, right: the comparison script).

For the evaluation of a particular piece of handwriting, the lecturer referred mainly to the multiplicity of the characteristics which must be

added to the mentioned fixed categories, such as

handwriting as expression of conscious and subconscious factors; inherited predispositions and acquired qualities, including the peculiarities caused by the particular moment; absolute and relative identity; establishment of proof through general and special script characteristics; value of proof inherent in rarity, subconsciousness, nonsuppressibility, and constancy; proof of identity -- complex of characteristic features; characteristics conflicting with the identity and caused by script distortions.

In addition we also have here the general script characteristics, such as:

handling of available space, script distribution, left-hand and right-hand margin of script; line interval -- proportions -- alignment of lines, level of forms and writing skill, writing style, spelling and grammar, punctuation, diacritical marks and hyphenation, adjustments, initial and terminal strokes, and the special characteristics in the individual forms.

Figure 17 shows a forgery by means of subsequent insertions with ink over folds in the paper: left, before, and right, after folding.

Figures 18 and 19 cover typewriter script identification. Figure 19 likewise shows the incriminating type on the left and the comparison type on the right. It shows the type relief on the reverse side of the paper; the script on the obverse side had been traced with pen and ink.

Figures 20 and 21 show the identification of the typewriter operator on the basis of type bar impact. In this case, the capital and lower-case letters are evaluated and classified separately. We have three categories here on the basis of the type bar impact: strong, medium, and weak. The result is recorded graphically similar to a diagram /sic/. First of all, the incriminating script must be evaluated and then the writing of the suspect must be studied. The two pictures clearly prove the success of such an expertise. At the top, we have in each case the result of the incriminating script and below we have the result of the scripts of two suspects. In the case at hand, it was not the subsequently caught culprit, but a fellow office worker of his, who was suspected. The expertise could prove one man's innocence and the other man's guilt.

Figure 22 finally shows insertions made in a second writing with the typewriter, where the forger failed to place the characters correctly below each other. (Cf. the text with the superposed numbers of the column

"Eingang" /receipts/, respectively, the line drawn through the particular numbers and extended downward.)

Unfortunately, we cannot reproduce additional valuable pictures, so that we had to omit references to

subsequent improvements in strokes during trace- and freehand-forgeries;
visible pretracing in tracing forgeries;
chloride picture of a pencil pretracing which has become visible;
ink script over typescript and vice versa;
determination of age of ink script with help of Hanikirsch reaction;
problematics of ink age determination;
determination of typewriter scripts.

But we hope that all these brief references will nevertheless help indicate the multiplicity of identification possibilities that they will familiarize the reader with the existence of such possibilities, and that they will also emphasize that, somewhere in a Swiss police unit, hand-writing is being classified and that there are also possibilities for typewriter script identification.

Handwriting Sample Collection

Classification according to Graphic Characteristics

1. Ligature form:

- 1 garland duct (leftward)
- 2 arcade duct (rightward)
- 3 angle duct

Mixed forms:

- 4 arcade-garland duct (thread duct)
- 5 garland-angle duct
- 6 arcade-angle duct
- 7 all other forms with exception of 4, 5, and 6.

I

2. Ligature degree:

- 1 connected -- contiguous group of five or more letters written in one stroke
- 2 unconnected -- letters completely separate next to each other or in groups of no more than four contiguously written letters each:
Normal interruptions after i, u, ñ, ñ, ñ, D, F, T, O, P, S, V, W, are not separately counted as such.

3. Character form:

- 1 plain
- 2 fancy

4. Distribution of "i" dot:

- 1 i-dot very low
- 2 i-dot very high
- 3 i-dot medium

II 5. Ascenders:

- 1 very small ascenders
- 2 very large ascenders
- 3 medium ascenders

6. Descenders:

- 1 very small descenders
- 2 very large descenders
- 3 medium descenders

7. Script width:

- 1 very narrow script
- 2 very wide script
- 3 medium script width

8. Script positioning:

- 1 steep script position and leftward slant
- 2 very strong righward slant
- 3 normal script position
- 4 changing script position

9. Script imprint pressure:

III

- 1 very thin
- 2 very thick
- 3 medium script strength

10. Script size: (determination through middle intervals)

- 1 very small
- 2 very large
- 3 medium script size

Note. The classification method is built up according to the scale of the increase of graphic execution difficulties, i.e., the characteristics which, when present, are harder to suppress or which, when absent, are harder to introduce, are at the beginning of the class subdivision.

Combination Possibilities

$7 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 4 \times 3 \times 3 = 81,648$ possibilities.

L Latin (pure)

L-D Latin and German mixed (predominantly Latin)

D-L German and Latin mixed (predominantly German)

D German (pure)

The digits of the graphic characteristics 1 - 3, 4 - 6 and 7 - 10 are combined into groups in the classification formula for greater clarity and are separated by intervals. Example of a handwriting formula:
311-323-3123.